ORDER

U. S. Department of Transportation
Federal Aviation Administration

8260.41

9/15/95

SUBJ: OBSTACLE ASSESSMENT SURFACE EVALUATION FOR INDEPENDENT SIMULTANEOUS PARALLEL PRECISION OPERATIONS

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1. PURPOSE. This order prescribes obstacle assessment surfaces to evaluate the obstacle environment for an air traffic-directed early turnout of aircraft conducting independent simultaneous parallel approaches. The guidance prescribed in this order identifies obstacles that must be considered for an aircraft directed by Air Traffic Control (ATC) to discontinue an Instrument Landing System (ILS) or Microwave Landing System (MLS) approach or missed approach and turn away from the approach course.

2. DISTRIBUTION. This order is distributed to all addressee on special distribution lists ZVN-826, ZVS-827 and ZAT-423.

3. BACKGROUND. One of the major aviation issues is the steady increase in the number and duration of flight delays. Airports have not been able to expand to keep pace with traffic growth. The Federal Aviation Administration (FAA) has taken a variety of measures to increase airport capacity. These include revisions to air traffic control procedures; addition of landing systems, taxiways and runways; and application of new technology. The Precision Radar Monitor (PRM) program is one of these new initiatives. PRM is an advanced radar monitoring system intended to increase utilization of multiple, closely-spaced parallel runways in Instrument Meteorological Conditions (IMC) weather by use of high resolution displays with alert algorithms and higher aircraft position update rate. Monitor controllers are required for both standard and closely-spaced runway separations. The primary purpose of radar monitoring during simultaneous, independent approach operations is to ensure safe separation of aircraft on the parallel approach courses. This separation may be compromised if an aircraft blunders off course toward an aircraft on the adjacent approach. For close parallel operations (3,400 feet but less than 4,300 feet) and for standard parallel operations (4,300 feet and above), the radar monitoring allows controllers to direct either aircraft off the approach course to avoid a possible collision. Resolution of a blunder is a sequence of events: the monitor alerts and displays the blunder, the controllers intervene, and the pilots comply with controller instructions; thus, increasing the operational safety, flyability, and airport capacity.

4. DEFINITIONS.

a. Course Width (CW). The angular deviation required to produce a full scale (±) course deviation indication of the airborne navigation instrument. This width is normally tailored in accordance with runway length to a full course sector width not greater than 6° (±3°), and a linear sector width of 700 feet (±350 feet each side of centerline) AT THRESHOLD for precision runways longer than 4,000 feet. Few Category I localizers operate with a course full sector width less than 3° (±1½°), even for those facilities that serve very long runways. Tailored width may be determined by the formula:

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Initiated By: AFS-421

$W = 2[\arctan(350 \div D)]$;
Where:
W = Tailored Width (in degrees)
D = Distance from the localizer antenna to the runway threshold (in feet)

b. Parallel Approach Obstruction Assessment (PAOA). An examination of specified surfaces, in addition to the ILS TERPS surfaces, in the direction away from the NTZ and adjacent parallel ILS runway, into which an aircraft on an early ILS breakout could fly.

c. Parallel Approach Obstruction Assessment Surfaces (PAOAS). Surfaces examined during the PAOA for obstacle penetration and depicted in appendix 1, figures 2 through 5.

d. Parallel Approach Obstruction Assessment Surface Penetration. One or more obstacles that penetrate the PAOAS.

e. Parallel Approach Obstruction Assessment Controlling Obstruction (PAOACO). The obstruction within the boundaries of the PAOAS which constitutes the maximum penetration of that surface.

f. No Transgression Zone (NTZ). See Orders 8260.3B, paragraph 997, and 8260.39.

g. Normal Operational Zone (NOZ). See Orders 8260.3B, paragraph 997, and 8260.39.

5. RELATED PUBLICATIONS. These criteria and procedures prescribed in this order are closely related to criteria contained in other publications as follows:

a. Order 6750.7, Category II ILS Program.

b. Order 6750.16B, Siting Criteria for Instrument Landing Systems (ILS).

c. Order 6830.5, Criteria for Siting Microwave Landing Systems.

d. Order 8240.47A, Determination of Instrument Landing System (ILS) Glidepath Angle, Reference Datum Heights (RDH), and Ground Point of Intercept (GPI).

e. Order 8260.3B, United States Standard for Terminal Instrument Procedures (TERPS).

f. Order 8260.34, Glide Slope Threshold Crossing Height Requirements.

g. Order 8260.36, Civil Utilization of Microwave Landing System (MLS).

h. Order 8260.39, Close Parallel ILS/MLS Approaches.

i. AC 120-29, Criteria for Approving Category I and Category II Landing Minima for FAR 121 Operators.

6. GENERAL. This order characterizes criteria used during the interim test phase of evaluating close parallel operations where early turnout obstacle assessments were accomplished by contractual means using terrestrial photometric techniques combined with survey methods of surface evaluation. This assessment technique is recommended for future evaluations of all independent simultaneous parallel approach operations. Facility information (glideslope (GS) angle, threshold crossing heights, touchdown zone, threshold elevations, etc.) may be obtained from air traffic planning and automation, flight procedures offices, and/or the systems management organizations for the regions in which independent simultaneous parallel operations are planned.

a. Parallel Runway Simultaneous ILS Approaches. The procedures for airports with multiple parallel runways must ensure that an aircraft approach on one runway is safely separated from those approaching the adjacent parallel runway. An example of such procedures is depicted in appendix 1, figure 1. Aircraft are directed to the two intermediate segments at altitudes which differ by at least 1,000 feet. Vertical separation is required when lateral separation becomes less than 3 nautical miles (NM), as aircraft fly to intercept and stabilize on their respective localizers (LOC). This 1,000-foot vertical separation is maintained until aircraft begin descent on the glideslope.

b. When lateral radar separation is less than the 3 NM and the 1,000-foot altitude buffer is lost, the aircraft must be monitored on radar. The controllers, on separate and discrete frequencies, will observe the parallel approaches, and if an aircraft blunders from the Normal Operating Zone (NOZ) into a 2,000-foot No Transgression Zone (NTZ), the monitor controller can intervene so that threatened aircraft on the adjacent approach are turned away in time to prevent a possible encounter. This maneuver, on the part of the threatened aircraft, is termed a "breakout" because the aircraft is directed out of the approach stream to avoid the transgressor aircraft. A controller for each runway is necessary so that one can turn the transgressing aircraft back to its course centerline while the other directs the breakout. See appendix 1, figure 1.

c. The 2,000-foot NTZ, flanked by two equal NOZ's, provides strong guidance to the monitor controller and maneuvering room for the aircraft to recover before entering the adjoining NOZ. Aircraft are required to operate on or near the approach course within the limits of the NOZ. If an aircraft strays into the NTZ or turns to a heading that will take it into the NTZ, it is deemed a threat to an aircraft on the adjacent course and appropriate corrective action or breakout instructions are issued.

7. CRITERIA. The PAOA evaluation shall be conducted to identify penetrating obstacles as part of a coordinated assessment for all independent simultaneous approach operations to parallel ILS/MLS runways. In these criteria, ILS glideslope/localizer terms are synonymous to and may be used interchangeably with MLS elevation glidepath/azimuth (GP/AZ) terms. The surface dimensions for the obstacle assessment evaluation are defined as follows:

a. Surface 1. A final approach course descent surface which is coincident with the GS/GP beginning at runway threshold with the width point abeam the threshold 350 feet from runway centerline opposite the NTZ, with lateral boundaries at the outer edge of the LOC/AZ CW, and ending at the farthest GS/GP intercept. See appendix 1, figure 2.

(1) Length and Height. Surface 1 begins over the runway threshold at a height equal to the threshold crossing height (TCH) for the runway, and continues outward and upward at a slope that is coincident with the GS/GP, to its ending at the GS/GP intercept point. See appendix 1, figure 2.

(2) Width. Surface 1 is centered on the extended LOC/AZ centerline. Surface 1 has a width equal to the lateral dimensions of the LOC/AZ course width. One-half surface 1 width is computed as the perpendicular distance from the extended runway centerline (CL) to the edge of the LOC/AZ course width as follows:

(a) 1/2 CW = Distance from THRESHOLD in feet along CL X TANGENT of CW beam angle divided by 2 + 350' ; e.g., $1/2CW = TH \quad Dist. \times TAN(\frac{CW \quad Angle}{2}) + 350'$

or;

(b) 1/2 CW = Distance from LOC ANTENNA, in feet, along CL X TANGENT of 1/2 CW beam angle; e.g., 1/2 CW=ANT Distance X TAN 1/2 CW angle. See appendix 1, figure 2.

b. PAOAS, Surface 2. A surface having a common boundary with the outer edge of surface 1 on the side opposite the NTZ, and slopes upward and outward from the edge of the descent surface 1 at a slope of 11:1, measured perpendicular to the LOC/AZ extended course centerline. Further application is not required when the 11:1 surface reaches a height of 1,000 feet below the Minimum Vector Altitude (MVA), Minimum Sector Altitude (MSA), or Minimum Obstacle Clearance Altitude (MOCA), whichever is lowest. See appendix 1, figure 3.

c. PAOAS, Surface 3. For ILS/MLS CATEGORY I, surface 3 begins at the point where surface 1 reaches a height of 200 feet above the runway Touch Down Zone Elevation (TDZE). At this point, surface 3 begins at a height of 100 feet above TDZE (100 feet lower than surface 1). From this point of beginning, the edge of surface 3 area splays at a 15° angle from a line parallel to the runway and rises longitudinally at a 40:1 slope along the 15° splay line CD while continuing laterally outward and upward at an 11:1 slope (line CE is perpendicular to the 15° splay line CD). Further application is not required when the 40:1 and 11:1 slopes reach a height of 1,000 feet below the MVA, MSA, or MOCA, whichever is lowest. See appendix 1, figure 4.

d. PAOAS, Surface 4. In lieu of surface 3, for ILS/MLS CATEGORY II approaches, surface 4 begins at the point where surface 1 reaches a height of 100 feet above the runway TDZE. At this point, surface 4 begins at the elevation of the runway (100 feet lower than surface 1). From this point of beginning, the edge of surface 4 area splays at a 15° angle from a line parallel to the runway and rises longitudinally at a 40:1 slope along the 15° splay line CD, while continuing laterally outward and upward at an 11:1 slope (line CE is perpendicular to the 15° splay line CD). Further application is not required when the 40:1 and 11:1 slopes reach a height of 1,000 feet below the MVA, MSA, or MOCA, whichever is lowest. See appendix 1, figure 5.

e. Establish a latitude-longitude list for all obstacles penetrating PAOA surfaces 2, 3, and 4. Identify locations of surface penetration within the surface areas. See appendix 1, figures 3, 4, and 5.

f. Surface 1 height, at any given centerline distance, may be determined in respect to threshold elevation, by adding the TCH to the product of centerline distance in feet from threshold times the tangent of the GS/GP angle.

g. Surface 2 height, at any given centerline distance, may be determined in respect to threshold elevation, by first computing the surface 1 height, then adding the height of the 11:1 measured from the edge of the LOC/AZ CW. Surface height over obstacles located in the surface 2 area are measured perpendicular to the final approach course centerline during the surface 2 assessment.

h. Surfaces 3 and 4 heights, at any given point, shall be determined in respect to TDZE by the SUM of the 11:1 rise measured perpendicular from 15° splay line CD to the obstacle AND the 40:1 rise measured perpendicular from line CE to the obstacle. Line CE is perpendicular to the 15° splay line CD. Beginning height of surface 3, point C, is 100 feet above the TDZE. Beginning height of surface 4, point C, is the TDZ elevation. Points D and E represent the ending of the surfaces 1,000 feet below MVA, MSA, or MOCA, whichever is lowest. See appendix 1, figures 4 and 5.

8. PARALLEL OPERATIONS APPLICATION REQUIREMENTS. PAOA obstacle penetrations shall be identified and, through coordinated actions of those affected, considered for electronic mapping on controller radar displays. If possible, penetrations should be removed by facilities considering independent simultaneous approach operations to parallel precision runways. Where obstacle removal is not feasible, air traffic operational rules shall be established to avoid obstacles. If a significant number of penetrations occur, a risk assessment study shall be required to provide guidance as to whether independent simultaneous ILS/MLS operations to parallel runways should be approved or denied.

9. INFORMATION UPDATE. Any deficiencies found, clarification needed, or suggested improvements regarding the content of this order, shall be forwarded for consideration to:

DOT/FAA
ATTN: Standards Development Branch, AFS-421
P. O. Box 25082
Oklahoma City, OK 73125

a. Your Assistance is Welcome. FAA Form 1320-19, Directive Feedback Information, is included with this order for your convenience. If an interpretation is needed immediately, you may call the originating office for guidance. However, you should also use the FAA Form 1320-19 as a followup to the verbal conversation.

b. Use the "Other Comments" block of this form to provide a complete explanation of why the suggested change is necessary.

Thomas C. Accardi
Director, Flight Standards Service

APPENDIX 1. FIGURES

Figure 1. INDEPENDENT SIMULTANEOUS PRECISION PARALLEL RUNWAY APPROACH ZONES.

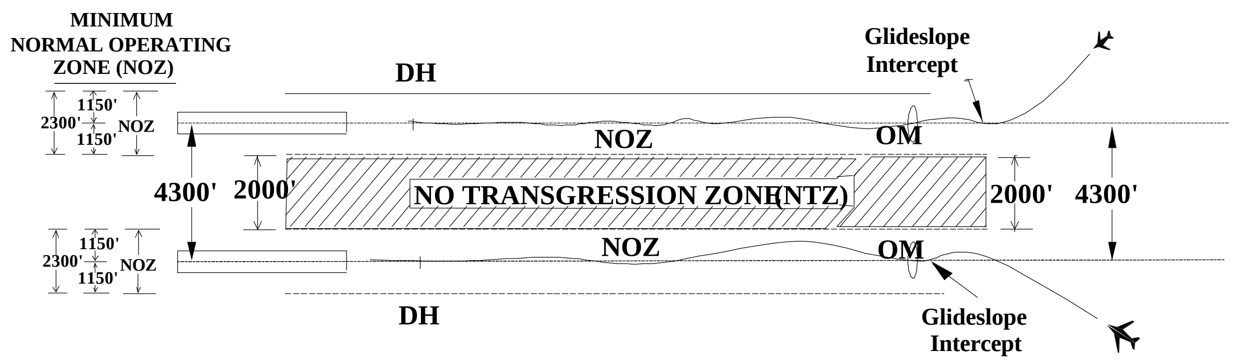


Figure 1A. INDEPENDENT SIMULTANEOUS ILS NO TRANSGRESSION ZONE AND NORMAL OPERATING ZONE. (Order 8260.3B, Paragraph 997.)

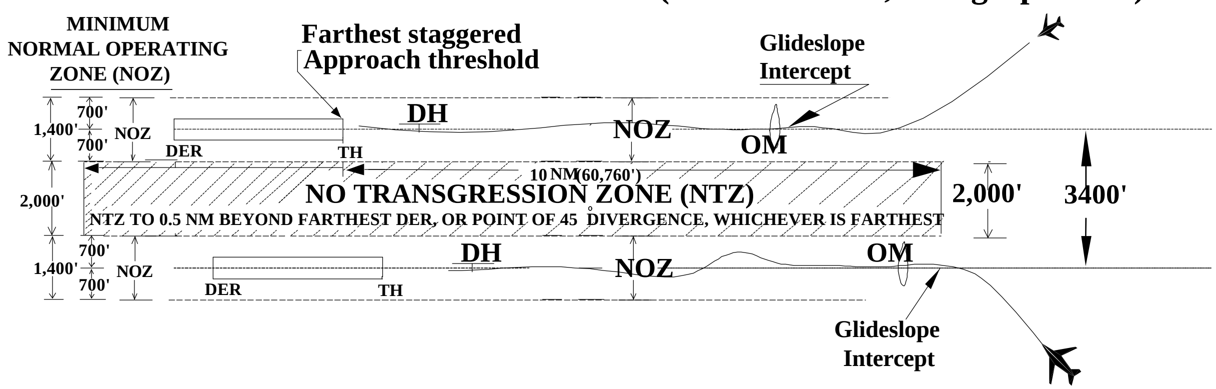
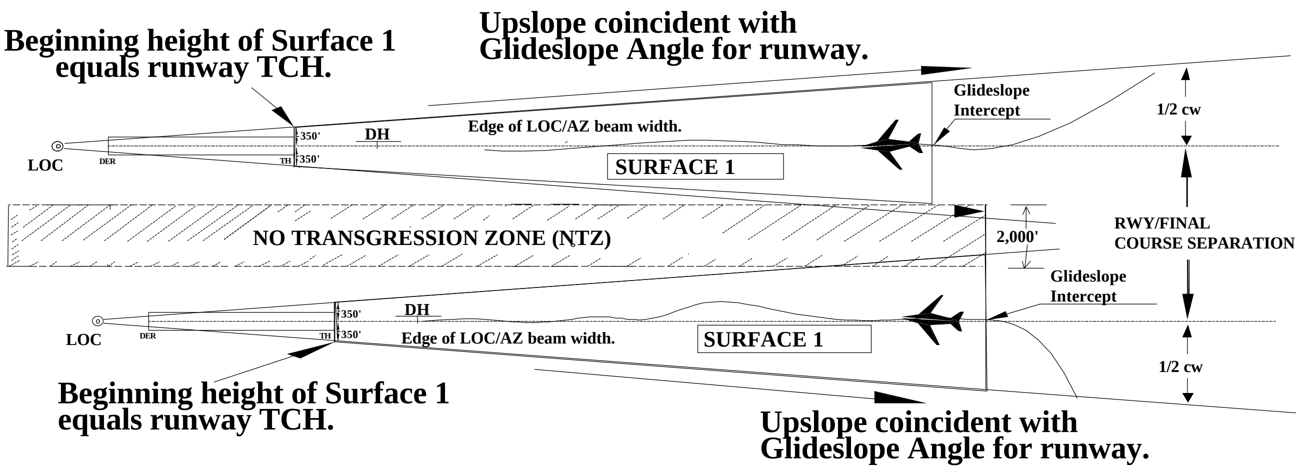


Figure 1B. CLOSE PARALLEL INDEPENDENT SIMULTANEOUS ILS APPROACHES NO TRANSGRESSION ZONE (NTZ) AND NORMAL OPERATING ZONE (NOZ). (Order 8260.39.)

Figure 2. FINAL APPROACH DESCENT SURFACE 1.



$^1/_2$ CW = Perpendicular distance from runway/extended C_L to edge of course beam width.

$^1/_2$ CW = Distance from Threshold in feet along C_L X TAN ($^1/_2$ Course Beam Angle) + 350'

OR

$^1/_2$ CW = Distance from LOC/AZ Antenna in feet along C_L X TAN $\left(\frac{\text{LOC/AZ Beam Angle}}{2}\right)$

Surface 1 Height = Distance from TH in feet along C_L X TAN of the GS/GP angle + TCH.

Figure 3. PARALLEL APPROACH OBSTACLE ASSESSMENT SURFACE 2.

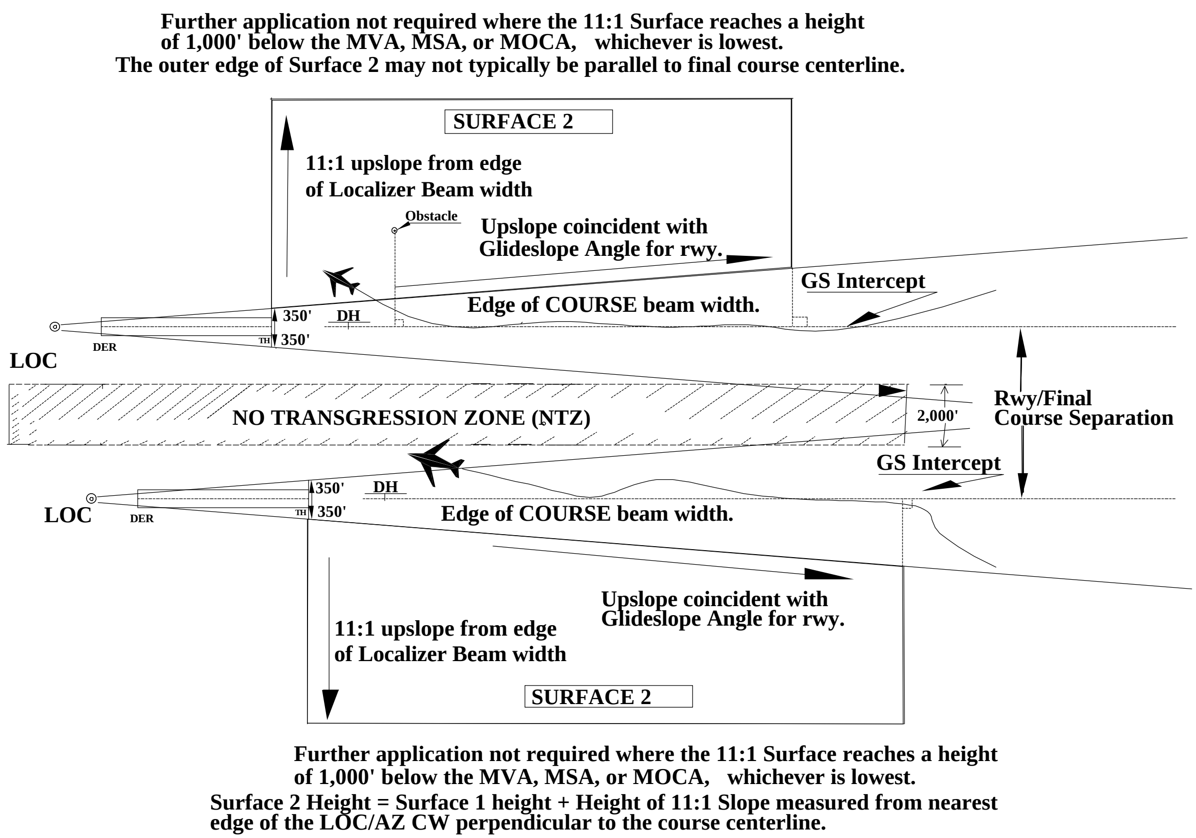


Figure 4. CAT I MISSED APPROACH EARLY BREAKOUT PARALLEL APPROACH OBSTACLE ASSESSMENT SURFACE 3.

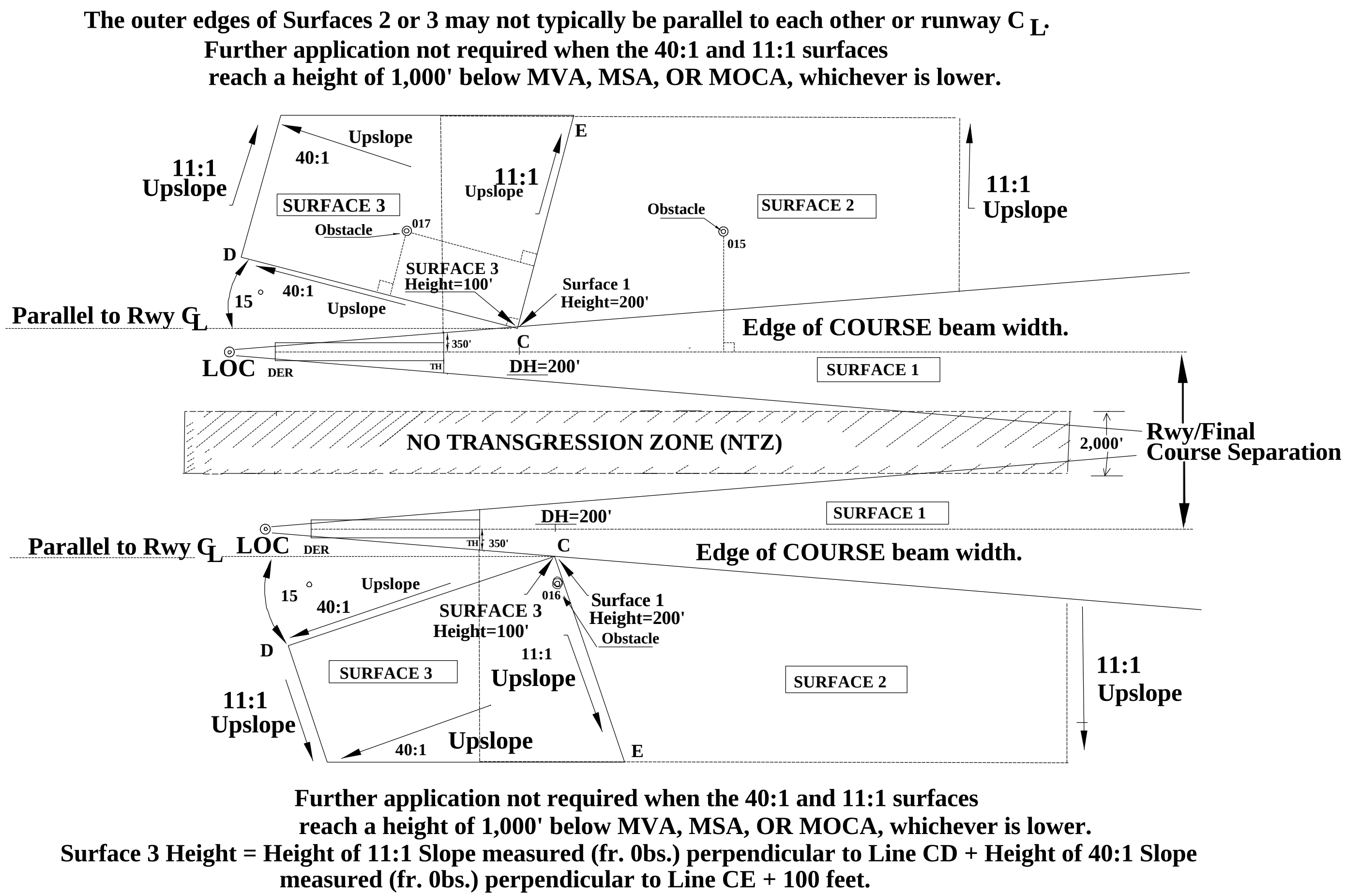
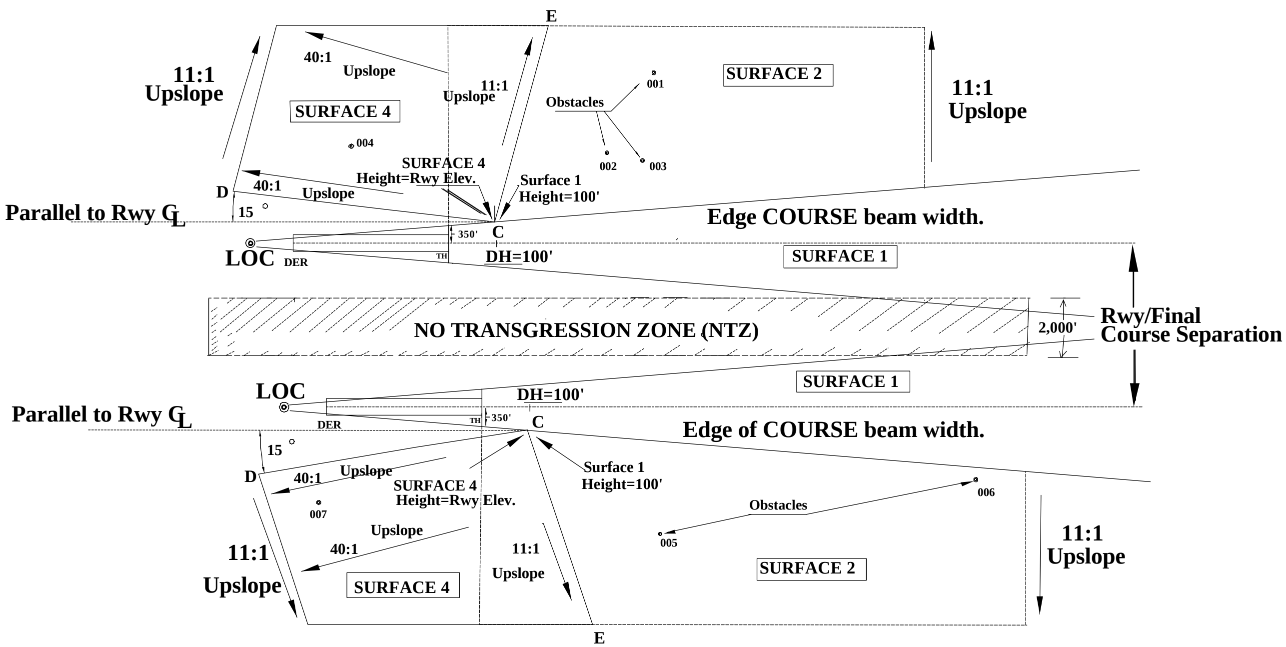


Figure 5. CAT II MISSED APPROACH EARLY BREAKOUT PARALLEL APPROACH OBSTACLE ASSESSMENT SURFACE 4

The outer edges of Surface 2 or 4 may not typically be parallel to each other or runway C L.
Further application not required when the 40:1 and 11:1 surfaces reach a height of 1,000' below MVA, MSA, OR MOCA, whichever is lower.



Further application not required when the 40:1 and 11:1 surfaces reach a height of 1,000' below MVA, MSA, OR MOCA, whichever is lower.

Surface 4 Height = Height of 11:1 Slope measured (fr. Obs.) perpendicular to Line CD + Height of 40:1 Slope measured (fr. Obs.) perpendicular to Line CE.